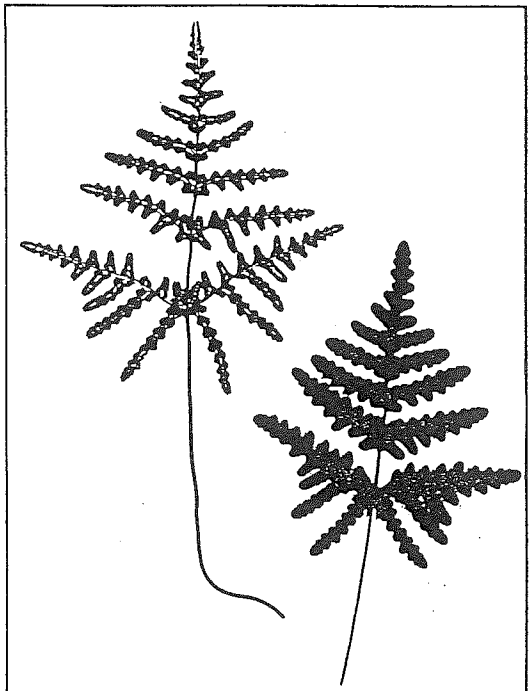
Goldback Fern in Idaho: A Coastal Disjunct

Karen Gray, Sarah Walker, and Mike Hays, White Pine Chapter; Bob Moseley, Pahove Chapter

Goldback fern (*Pentagramma triangularis* ssp. *triangularis*–formerly *Pityrogramma triangularis*) is a distinctive fern with a pale to bright yellow waxy powder on the underside of its leaves. The mature leaves are leathery and green on the upper surface and have a triangular or pentagonal shape (depending on whether you are counting the bottom two pinnules as sides of the polygon). New leaves begin to appear in late summer and remain green during the winter.

Goldback fern's primary range is along the west coast of North America from British Columbia to Mexico. Four inland, disjunct populations have recently been documented in Idaho (Figure 1). Prior to these recent discoveries, it had been collected from two other inland locations: Skillen and Warren made a collection in 1928 in Big Canyon Creek on the Snake River in Idaho, and Harold St. John and F. L. Pickett collected it in 1921 at Granite Point in southeast Washington. In 1966, A. A. Cridland & L. V. Mingrone revisited Granite Point and made a collection from the same location. Their label said " may be the last collection from this locality because of the destruction of Granite Point." Granite Point is 20 km southwest of Pullman. Daubenmire discussed goldback fern as one of several plants that grow in rock crevices in the steppe region, and said its habitat at Granite Point had been " essentially destroyed in creating a dam" (Daubenmire 1970:77).



Goldback fern
(Pentagramma triangularis ssp. *triangularis).*

Left: underside of leaf showing light and dark pattern of brown spores and gold powder.

Susan Bernatas and Bob Moseley collected the fern in Idaho in 1988 near Dry Creek along the Snake River in Hells Canyon (Moseley and Bernatas 1991:193). Subsequently, two more populations were reported in canyons tributary to the Clearwater River: Little Canyon near Peck, and Bull Run Creek east of Moscow. Recently, a population was also found in Cave Gulch, a tributary of the Snake River. The Snake and the Clearwater Rivers join near Lewiston.

All of the recently located populations were found on mossy rock outcrops. Goldback fern is apparently not choosy about its rock substrate. The Little Canyon and Bull Run Creek ferns are both on Columbia River basalt. The two Snake River Canyon populations are on rocks of exotic terranes. The Dry Creek plants are on rocks of the Wild Sheep Creek Formation, and the Cave Gulch plants are on Coon Hollow Formation rocks. Both formations are part of an island arc that moved in from the Pacific Ocean 120 million years ago and docked against what was then the edge of the North American continent. The Wild Sheep Creek rocks are from the island mounts in the formation, however, and the Coon Hollow rocks were formed from sediments deposited in basins associated with the islands.

Holes or tunnels in the loose structure of the rocks may mediate the microclimate near the ferns. Sarah Walker found that the ground temperature in winter among the Little Canyon ferns was warmer by as much as 10°F than temperatures a few feet away from the population periphery. Water in the cracked outcrops may be the agent of mediation.

The ferns were found on aspects ranging from northwest to north and east, and at elevations of from 1,500 feet at Dry Creek to nearly 2,700 feet at Bull Run Creek.

Ownership of the sites is varied. Dry Creek is in the Hells Canyon National Recreation area, administered by the Wallowa-Whitman National Forest. The Little Canyon sites are all on private land. Mike Hays discovered the large population (at least 500 clumps) near Bull Run Creek on the Palouse Ranger District, which is administered by the Clearwater National Forest. Cave Gulch is owned by the Bureau of Land Management, but managed cooperatively with The Nature Conservancy.

Goldback fern was given a State Priority 2 status at the 1998 Rare Plant Conference. That priority refers to " a taxon likely to be classified as Priority 1 within the foreseeable future in Idaho, if factors contributing to its population decline or habitat degradation or loss continue." The Bull Run Creek plants don't seem to have an imminent threat. The Cave Gulch and Little Canyon populations may be threatened by

exotics, including yellow star-thistle and cheatgrass. The Dry Creek site was in good condition when it was last seen.

Interestingly, at least two of the mosses found with the goldback fern are also disjunct from larger populations on the west coast. *Amphidium californicum* was collected from both the Bull Run Creek and the Cave Gulch sites. It is a moss of Mediterranean climates and endemic to western North America. It is rare in the Columbia Plateau; so far these are the only two collections that have been located from Idaho. The other disjunct moss, *Anacolia menziesii* var. *baueri*, has a distribution centered in California, where it is abundant throughout the state. It becomes less common northward in Oregon, Washington, and British Columbia. Disjunct locations are reported in northern Idaho, from Spokane southward to the Snake and Clearwater Rivers. Idaho has a large suite of plants and lichens that are disjunct from the Pacific Coast; however, the majority are plants of temperate rain forests. These three plants all grow in Mediterranean (summer dry-winter wet) climates, although the Bull Run site is more or less in a transition zone, with many rainforest disjuncts also nearby.

The Bull Run area is a mosaic of bunchgrass grasslands, western red cedar forests, and Douglas fir/ninebark patches. The goldback ferns are in a basalt landslide with several shrubs including syringa, ninebark, ocean spray, Rocky Mountain maple, serviceberry, and thimbleberry. The other three sites are in Pacific northwest bunchgrass habitat, although the Little Canyon site also has scattered Douglas fir and ponderosa pine. The Dry Creek and Cave Gulch ferns both occur on small rock outcrops surrounded by grasslands.

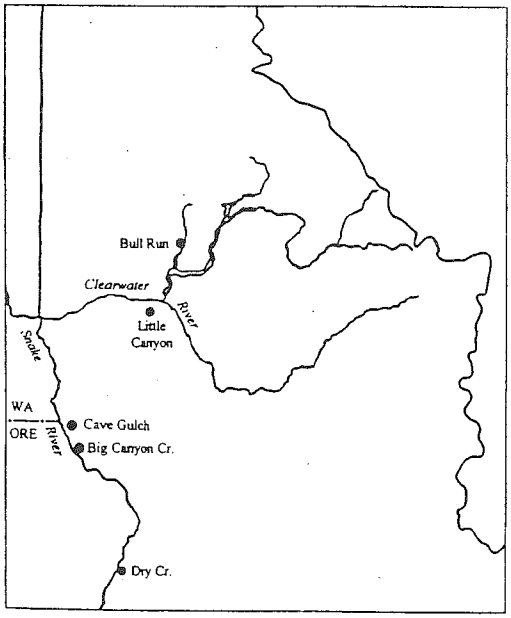


Figure 1. Locations where goldback fern has been collected.

How did these plants come to be separated from the main distributions of their species? It is possible they had a more continuous distribution in the past, but the populations connecting Idaho and the west coast no longer exist. Alternatively, their spores may have dispersed from the west coast up the Columbia River Canyon to Idaho. Another possibility is that there may presently exist undocumented occurrences in the outcrops along the Columbia. Steep, mossy rocks are hard to explore, and future collectors may discover a more continuous distribution of goldback fern and the two associated mosses. Wilhelm Suksdorf collected *Amphidium californicum* around Bingen, Washington, which is about one third of the way up the Columbia toward Idaho.

Additional Reading

Daubenmire, R. 1970. Steppe Vegetation of Washington. Wash. Agric. Exp. Sta. Tech. Bull. No. 62. Pullman. 131 pages.

Moseley, R. K., and S. Bernatas. 1991. Confirmation of *Pentagramma triangularis* in Idaho. Am. Fern Journ. 81:66-67.

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Yatskievych, G. and M.D. Windham. 1993. *Pentagramma triangularis* subsp. *triangularis*, p. 151 *in* Flora of North America North of Mexico, Volume 2. Flora of North America Editorial Committee. New York. 475 pp.